FERROELECTRICITY IN AURIVILLIUS-TYPE STRUCTURE CERAMICS WITH n=2

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Aurivillius-type structure compounds are good candidates for their use as high temperature piezoelectrics, due to their high ferro-paraelectric phase transition temperature. However, this characteristic is correlated to a high coercive field that makes difficult the poling process, necessary to have piezoelectric activity. The dielectric properties, specially the conductivity, determine the maximum applicable poling field. On the other hand, the piezoelectric properties are directly related to the ferroelectric remanent polarization. Thus, the study of both characteristics is a key issue to improve the piezoelectric properties of these materials.

In this work, ceramics of composition $(SrBi_2Nb_2O_9)_{0.35}(Bi_3TiNbO_9)_{0.65}$ (T_C~760ºC) have been prepared by hot pressing of mechanically activated precursors [1,2]. The dielectric properties (permittivity, dielectric loss factor and d. c. conductivity) as a function of frequency and temperature have been studied, up to temperatures higher than the ferro-paraelectric phase transition one. For the first time, well-saturated ferroelectric hysteresis loops at 250ºC of this composition are given, with values of P_r=21.4 μC/cm^2 and E_c=70.4 kV/cm.

[1] A. Moure, L. Pardo, C. Alemany, P. Millán y A. Castro. "Piezoelectric ceramics based on Bi_3TiNbO_9 from mechanochemically activated precursors". *J.Eur. Ceram. Soc* 21, 1399-1402 (2001).

[2] A. Moure, A. Castro y L. Pardo. "Improvement by recrystallization of the microstructure and mechanical properties of Aurivillius-type structure piezoceramics from mechanically activated precursors". *Acta Mater.* 52, 945-957 (2004).